REMARKS

Claims 1 - 4 and 6-20 are in this application and are presented for consideration. By this amendment, Applicant has amended claims 1 - 4 and 6-12. Claim 5 has been canceled. New claims 13-20 have been added. Applicant wishes to bring to the Examiner's attention that the claims 1- 4 and 6-12 as now presented have been granted by the European Patent Office.

Claims 1 - 4 have been rejected under 35 U.S.C. 102(b) as being anticipated by Osawa (JP 10-321583).

Applicant has amended claim 1 to clarify that a thermal radiator unit is arranged above a receiving system and at least one circuit substrate. This arrangement has the advantage that since a part of the circuit substrate, which changes, remains in the liquid bath during the application of temperature, heat is always dissipated from the circuit substrate into the liquid bath in parallel to the temperature application, so that overheating of the substrate may be precluded as much as possible. In addition, the application of the temperature through thermal radiation allows essentially convection-free heating of the circuit substrate, so that contamination by contaminants carried along in a convection flow may be precluded as much as possible. Furthermore, if the thermal radiator unit is situated above the receiving system and above the circuit substrate, simple positioning of the thermal radiator unit above the liquid level is possible, which allows simultaneous application to multiple circuit substrates received in the receiving system (page 4, line 30, to page 5, line 1). As a result of the absorption of the thermal radiation in the semiconductor material of the wafers, the part of the wafers situated above the liquid level is heated, while in contrast a part of the wafers situated in the flushing

liquid is relatively cooled by the heat transfer between the semiconductor material and the flushing liquid. This prevents overheating of the semiconductor material, which impairs the function of the wafer, from being able to occur in spite of the fact that heating of the semiconductor material is sufficient for evaporation of the flushing liquid in the area of the liquid meniscus. Further, the thermal transition, which is essentially restricted to the boundary area between the surfaces of the wafer and the liquid meniscus ensures that heating and reduction of the surface tension of the flushing liquid associated there only occur in the above-mentioned boundary area, so that adjacent thereto, the surface tension of the flushing liquid is essentially maintained and drops are prevented from forming in the area of the liquid meniscus. The prior art as a whole fails to disclose such features and such heat transfer advantages associated with such features.

Osawa discloses a method for drying a flat substrate completely without a trace of water drops on a surface thereof, in which the flat substrate like an LCD substrate or a semiconductor substrate is dried by forming a meniscus caused by surface tension of water and using infrared ray. Each drain block 4 is counterposed to the surface of a flat substrate 1 so as to form a small gap for causing capillary phenomenon between them. At a former position, each separation plate for removing most water drops on the surface of the substrate 1 is also counterposed to the surface of the substrate 1. After cleaning and rinse, the substrate 1 is carried by a roller 2 and passed through the separation plate and the drain block 4 so that the water drop (W) remaining on the surface is diffused uniformly on the surface of the substrate 1 to form meniscus 10 between the surface of the substrate 1 and an edge face 9 of the drain block 4 on

the outlet side. Then, the meniscus part is irradiated and heated by a far infrared ray heater and water is vaporized and dried.

Osawa fails to teach and fails to suggest a thermal radiator unit that is arranged above a receiving system and a circuit substrate as claimed. Osawa merely discloses that a substrate 1 is carried by a roller 2 and passed through a separation plate and a drain block 4 so that water drops (W) remaining on the surface is diffused uniformly on the surface of the substrate 1 to form meniscus 10 between the surface of the substrate 1 and an edge face 9 of the drain block 4 on the outlet side. According to Osawa, the meniscus part is irradiated and heated by an infrared ray heater and water is vaporized and dried. However, Osawa does not provide any teaching or suggestion for a thermal radiator that is arranged above a receiving system and a circuit substrate as featured in the present invention. Compared with Osawa, a receiving system of the present invention receives at least one substrate. According to the present invention, a thermal radiator unit is arranged above the receiving system and the circuit substrate. This advantageously allows multiple substrates to be heated and dried at one time. Compared with the present invention, Osawa takes a completely different approach. Osawa merely discloses a heating device that is directed toward a meniscus 10 between a surface of a substrate 1 and an edge face 9 of a drain block 4 on an outlet side. Osawa is void of any mention of a receiving system that receives a circuit substrate and a thermal radiator unit that is provided above the circuit substrate and the receiving system as claimed. As such, the prior art as a whole takes a completely different approach and fails to teach or suggest each and every feature of the claimed combination. Accordingly, Applicant respectfully requests that

the Examiner favorably consider claim 1 and all claims that depend thereon.

Claims 5-12 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Osawa in view of Hood (US 3,953,265).

Osawa fails to teach and fails to suggest a thermal radiator unit that is arranged above a receiving system and a circuit substrate wherein the thermal radiator unit applies simultaneous application of thermal radiation to multiple circuit substrates arranged in the receiving system as claimed. Osawa merely discloses that a substrate 1 is carried by a roller 2 and passed through a separation plate and a drain block 4 so that water drops (W) remaining on the surface is diffused uniformly on the surface of the substrate 1 to form a meniscus 10 between the surface of the substrate 1 and an edge face 9 of the drain block 4 on the outlet side. According to Osawa, the meniscus part is irradiated and heated by an infrared ray heater and water is vaporized and dried. However, Osawa does not provide any teaching or suggestion for a thermal radiator that applies simultaneous application of thermal radiation to multiple circuit substrates arranged in a receiving system as featured in the present invention. Compared with Osawa, a receiving system of the present invention receives at least one substrate. According to the present invention, a thermal radiator unit is arranged above the receiving system and the circuit substrate such that the thermal radiation is applied to multiple circuit substrates arranged in the receiving system. This advantageously increases efficiency since multiple substrates can be heated and dried at one time. In contrast with the present invention, Osawa takes a completely different approach. Osawa merely discloses a heating device that is directed toward a meniscus 10 between a surface of a single substrate 1 and an

edge face 9 of a drain block 4 on an outlet side. Osawa is void of any mention of a receiving system that receives multiple circuit substrates and a thermal radiator unit that is provided above the circuit substrate and the receiving system such that the thermal radiator unit applies thermal radiation to the multiple circuit substrates as claimed. As such, the prior art as a whole takes a completely different approach and fails to teach or suggest each and every feature of the claimed combination.

Hood discloses an arrangement which can accommodate several manufacturing steps that use meniscus-contained fluid bodies on a silicon wafer 18 at a single location in a processing chamber 10. The processing chamber 10 receives a semiconductor wafer 18 on three support pes 12b in a centrifugal chuck 12 so that the wafer 18 is supported horizontally thereon. A pressurized air source 17 is communicated to an air motor 13 by an electrically-controlled valve switch 16 to controllably rotate shaft 11 and its connected chuck 12. A valve may be actuated to spray rinse fluid from nozzle 51d after the semiconductor wafer 18 is subjected to etching.

Hood does not teach and does not suggest a thermal radiator unit that is arranged above a receiving system and a circuit substrate wherein the thermal radiator unit applies simultaneous application of thermal radiation to multiple circuit substrates arranged in the receiving system as claimed. Hood merely discloses a single water that is provided on three pegs 12b in a centrifugal chuck 12 so that the wafer 18 is supported during an etching process. This does not provide any teaching or suggestion as to a receiving system that receives multiple circuit substrates wherein the multiple substrates can be subject to thermal radiation at the

same time as featured in the present invention. The centrifugal chuck 12 only allows only a single wafer to be etched and heated at one time. This disadvantageously does not provide an effective and efficient way to cleanse multiple circuit substrates as featured in the present invention. Compared with Hood, a receiving system of the present invention receives at least one substrate. According to the present invention, a thermal radiator unit is arranged above the receiving system and the circuit substrate such that the thermal radiation is applied to multiple circuit substrates arranged in the receiving system. This advantageously increases efficiency since multiple substrates can be heated and dried at one time. In contrast with the present invention, Hood takes a completely different approach. Hood merely discloses a single chuck that is supported during an etching. Hood is void of any teaching as to a receiving system that receives multiple circuit substrates and a thermal radiator unit that is provided above the circuit substrate and the receiving system such that the thermal radiator unit applies thermal radiation to the multiple circuit substrates as claimed. As such, the prior art as a whole takes a completely different approach and fails to teach or suggest each and every feature of the claimed combination. Accordingly, Applicant respectfully requests that the Examiner favorably consider claim 7 and all claims that depend thereon.

Applicant has added new claims 13-20. New independent claim 16 has been added to clarify that a fluid is delivered to a fluid holding structure to cover the receiving system and the amount of fluid in the fluid holding structure is decreased after delivering the fluid to the fluid holding structure and a surface of the circuit substrate is dried with a thermal radiator unit after or during the step of decreasing the amount of the fluid. New dependent claims 13-15 and

17-20 have been added to further clarify the features of the invention. Applicant respectfully requests that the Examiner favorably consider new claims 13-20.

Favorable consideration on the merits is requested.

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